

CLAIMS:

1. A method for communicating digital data using an orthogonal frequency division multiplexing (OFDM) transmission system (10) including at least one transmitter (600, 601) and receivers (700, 701), the method comprising the steps of:
 - 5 selecting a mode of operation in a transmitter among at least one mode, each mode of operation being associated with a number of active carriers for payload data transmission;
 - selecting a symbol interleaver in the transmitter from a set of symbol inter-
 - 10 leavers for symbol interleaving in said selected mode of operation;
 - applying symbol interleaving in the transmitter on blocks of data units;
 - mapping the interleaved data units onto the active carriers of said selected mode of operation;
 - receiving the interleaved data units in the receiver;
 - 15 recognizing in the receiver the symbol interleaver used in the data transmission;
 - selecting a de-interleaver in the receiver to correspond to the recognized symbol interleaver, and
 - de-interleaving in the receiver the received data units using the selected de-
 - 20 interleaver.
2. A method according to claim 1, wherein the number of data units in the block onto which the symbol interleaving is applied differs from the number of the active carriers in said selected mode.
- 25 3. A method according to claim 2, wherein the number of data units in the block and the number of active carriers in said selected mode are integer multiples of each other.
- 30 4. A method according to claim 3, wherein the number of data units in the block

and the number of active carriers in said selected mode are even integer multiples of each other.

5. A method according to any of claims 2 to 4, wherein the number of data units
5 in the block is larger than the number of active carriers.
6. A method according to claim 5, wherein the number of data units in the block is two or a multiple of two times the number of active carriers.
- 10 7. A method according to any of claims 2 to 4, wherein the number of data units in the block is smaller than the number of active carriers.
8. A method according to claim 7, wherein the number of active carriers is two or a multiple of two times the number of data units in the block.
- 15 9. A method according to claim 1 or 2, wherein the selection of the symbol interleaver for symbol interleaving in the selected mode of operation is based on a desired depth of interleaving.
- 20 10. A method according to claim 1 or 2, wherein the set of symbol interleavers comprises at least an 8K mode symbol interleaver and a 2K mode symbol interleaver and at least a 4K mode of operation is selectable for a DVB-T (Digital Video Broadcasting-Terrestrial) system.
- 25 11. A method according to claim 1 or 2, wherein the set of symbol interleavers comprises at least an 8K mode symbol interleaver and at least a 2K mode of operation is selectable for a DVB-T system.
- 30 12. A method according to any preceding claim, wherein the data units are data units of one or more OFDM-symbols.

13. A method according to any preceding claim, wherein the digital data communication system is one of the following: a DVB-T (Digital Video Broadcasting-Terrestrial) system, an ISDB-T (Integrated Services Digital Broadcasting-Terrestrial) system.

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14. A method according to any of claims 2 to 13, wherein the data units form part of one of the following: a broadband digital television transmission, a datacasting transmission.

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15. A transmitter (600, 601) for communicating digital data using an orthogonal frequency division multiplexing (OFDM) transmission system, the system having a set of modes of operation, said set comprising at least one mode of operation, each mode being associated with a predetermined number of active carriers used for transmitting payload data from the transmitter to a receiver (700, 701), the

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transmitter comprising:

a set of symbol interleavers (130) for symbol interleaving,

means for selecting a mode of operation for data transmission and

means for selecting a symbol interleaver from the set of symbol interleavers for symbol interleaving in said selected mode of operation.

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16. A transmitter according to claim 15, wherein said set of symbol interleavers (130) form part of an inner interleaver (100) of the transmitter.

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17. A transmitter according to any of claims 15 to 16, wherein the transmitter (600) is arranged to transmit information indicative of said selected symbol interleaver to an OFDM receiver (700).

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18. A transmitter according to claim 18, wherein one or more TPS (Transmission Parameter Signalling) bits are arranged to convey said information indicative of said selected symbol interleaver.

19. A receiver (700) for communicating digital data using an orthogonal frequency division multiplexing (OFDM) transmission system, the system having a set of modes of operation, said set comprising at least one mode of operation, each mode being associated with a predetermined number of active carriers used for transmitting data units from a transmitter (600) to the receiver, the system further having a set of symbol interleavers (130) to be used for symbol interleaving at the transmitter, the receiver comprising:
- means for receiving interleaved data units;
 - means for recognizing the symbol interleaver used in the data transmission;
 - a set of symbol de-interleavers for de-interleaving received data units which have been interleaved at the transmitter in the symbol interleaver and
 - means for selecting a symbol de-interleaver from the set of symbol de-interleavers corresponding to the recognized symbol interleaver.
20. A receiver according to claim 19, wherein the receiver (700) is arranged to receive information indicative of the used symbol interleaver.
21. A receiver according to claim 19, wherein an output from the means for recognizing the symbol interleaver used in the data transmission is an information indicative of the recognized symbol interleaver.
22. A receiver according to any of claims 19 to 21, wherein the receiver (700) is one of the following: a fixed receiver, a mobile receiver.
23. A receiver according to any of claims 19 to 22, wherein the receiver (700) comprises means for a return channel via a cellular radio network and/or via a fixed network.
24. A digital data communicating system using an orthogonal frequency division multiplexing (OFDM) transmitting system comprising at least one transmitter

(600, 601) and a plurality of receivers (700, 701), the system having a set of modes of operation, said set comprising at least one mode of operation, each mode being associated with a predetermined number of active carriers used for transmitting payload data from a transmitter to at least one receiver, the transmitter having a set of symbol interleavers (130) to be used for symbol interleaving on blocks of data units at the transmitter, the at least one receiver having a set of symbol de-interleavers for de-interleaving the interleaved data units at the receiver, the system further comprising:

means in the transmitter for selecting a mode of operation to be used in data transmission;

means in the transmitter for selecting a symbol interleaver for symbol interleaving in selected mode of operation;

means in the transmitter for applying symbol interleaving on blocks of data units;

means in said at least one receiver for receiving transmitted interleaved data units;

means in said at least one receiver for recognizing the symbol interleaver used in the data transmission;

means in said at least one receiver for selecting a symbol de-interleaver from a set of symbol de-interleavers corresponding to the recognized symbol interleaver.

25. A system according to claim 23, wherein the ratio between the number of the active carriers in the different modes of operation is an integer number.

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26. A system according to claim 24, wherein the ratio between the number of the active carriers in the different modes of operation is two or a multiple of two.

27. A system according to any of claims 23 to 25, wherein the number of symbol interleavers in the set of symbol interleavers is smaller than the number of the modes of operation of the system.

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